

REMARKS

Claims 15-34 are pending in this application, claims 30-34 having been withdrawn. By this Amendment, claims 15, 22, 28 and 29 are amended. Support for the amendments to claim 15 can be found in the specification as filed, for example, at page 4, line 29 through page 5, line 6. Support for the amendment to claim 22 can be found in pending claim 15. Support for the amendments to claims 28 and 29 can be found in the specification as filed, for example, at page 7, lines 28-29. Thus, no new matter is added by these amendments.

Entry of the amendments is proper under 37 CFR §1.116 since the amendments: (a) place the application in condition for allowance for the reasons discussed herein; (b) do not raise any new issue requiring further search and/or consideration since the amendments amplify issues previously discussed throughout prosecution; (c) satisfy a requirement of form asserted in the previous Office Action; (d) do not present any additional claims without canceling a corresponding number of finally rejected claims; and (e) place the application in better form for appeal, should an appeal be necessary. The amendments are necessary and were not earlier presented because they are made in response to arguments raised in the final rejection. Entry of the amendments is thus respectfully requested.

I. Restriction Requirement

Claims 30-34 are withdrawn from consideration as subject to a Restriction Requirement. Method claims 30-34 depend from claim 15 (elected Group I) and are directed to methods for manufacturing the composition of claim 15; therefore, method claims 30-34 include all of the limitations of elected claims 15.

Applicants respectfully request rejoinder of non-elected method claims 30-34. Where product and process claims are presented in the same application, Applicants may be called upon under 35 U.S.C. §121 to elect claims to either the product or process. MPEP §821.04. However, in the case of an elected product claim, rejoinder will be permitted when a product

claim is found allowable and the withdrawn process claim depends from or otherwise includes all the limitations of an allowed product claim. Id. Since process claims 30-34 include all the limitations of allowable product claim 15, the process claims 30-34 must be rejoined with the product claims. Applicants respectfully request withdrawal of the Restriction Requirement and rejoinder of claims 30-34.

II. Rejections Under 35 U.S.C. §112, second paragraph

The Office Action rejects claims 15-29 under 35 U.S.C. §112, second paragraph, as indefinite for failing to particularly point out and distinctly claim the subject matter which Applicants regard as the invention. Applicants respectfully traverse this rejection.

Specifically, the Office Action points to the phrase “acrylic esters” in claim 15, and the phrases “acrylic polymer” and “acrylic rubbers and polyacrylates” in claims 16 and 17, respectively. Applicants respectfully submit that claim 15 has been amended to replace the phrase “acrylic esters” with the phrase “acrylic polymers.” Support for this amendment can be found in the specification as filed, for example, at page 4, line 29 through page 5, line 6. Applicants respectfully submit that no new matter is added by this amendment and that this amendment clarifies at least claims 15-17.

The Office Action also asserts that claim 15 is unclear, stating “it is not clear whether the binder may include any polymer not named that has a MW as recited, and then may also have an acrylic ester of low weight, e.g., as a cross-linker for the high MW polymer.” Applicants respectfully submit that claim 15 is clear, and that the binder as set forth comprises at least one solid polymer, having a molecular mass greater than 200,000, selected from the group consisting of polyester polymers and acrylic polymers, and comprises at least one liquid constituent selected from the group consisting of a polyester resin and a plasticizer. The claim language specifically includes the components specified, and may include other materials as well. Thus, Applicants respectfully submit that claim 15 is clear.

In addition, the Office Action points out that claim 15 recites “optionally at least one additive,” but that dependent claim 22 does not recite that the additive is optional. Applicants respectfully submit that claim 22 has been amended to include the term “optional” and that claim 22 is not indefinite.

The Office Action also asserts that a number of terms are incorrectly rendered, specifically the phrase “wetting agent” in claims 28 and 29. Claims 28 and 29 have been amended to properly recite a “component reducing the residual porosity” rather than a “wetting agent.” Support for this amendment can be found in the specification as filed, for example, at page 7, lines 28-29. Applicants respectfully submit that the claim terms are correctly rendered and that the claims are not indefinite.

Accordingly, Applicants respectfully submit that claims 15-29 are not indefinite. Reconsideration and withdrawal of the rejection are respectfully requested.

III. Rejections Under 35 U.S.C. §112, first paragraph

The Office Action rejects claims 15-29 under 35 U.S.C. §112, first paragraph as containing subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventors, at the time the application was filed, had possession of the invention. Applicants respectfully traverse this rejection.

Specifically, the Office Action asserts that “it is not clear that applicant has properly disclosed what the invention is, ..., as to the polymer details therein.” Applicants respectfully disagree with this assertion.

Applicants respectfully direct the Examiner’s attention to the specification, at page 9, lines 19-28, which describes the essential features of the invention. This description includes the binder comprising a gum and a liquid constituent which is either a resin or a plasticizer.

The gum is more fully described at page 5, lines 8-12, and includes polymers with a molecular mass greater than 200,000. Acrylic gums are disclosed as well.

Applicants respectfully submit that at least the above-described passages fully disclose the polymeric binders claimed herein. In addition, claim 15 has been amended to set forth “at least one solid polymer” to more clearly set forth the subject matter claimed therein.

Further, the Office Action asserts that “it is not clear what applicants meant by the ‘gum’ language.” Applicants respectfully disagree with this assertion as well. The word “gum” was, by a previous amendment, replaced by the definition of “gum” appearing in the specification. That is, “gum” was replaced by “a polymer having a molecular weight greater than 200,000.” Such a polymer is solid, as described in the specification at page 11, lines 15-16.

Accordingly, Applicants respectfully submit that the specification as filed fully complies with the written description requirement and that claims 15-29 are fully supported by the specification as originally filed. Reconsideration and withdrawal of the rejection are respectfully requested.

IV. Rejections Under 35 U.S.C. §103(a)

The Office Action rejects claims 15-29 under 35 U.S.C. §103(a) over U.S. Patent 5,861,571 to Scheffee et al., in view of U.S. Patent 3,698,316 to Evans, U.S. Patent 6,517,647 to Yamoto, U.S. Patent 6,224,099 to Nielson et al., U.S. Patent 6,485,587 to Han et al. and U.S. Patent 5,753,853 to Monte et al. Applicants respectfully traverse this rejection.

Claim 15 sets forth, in pertinent part, a “solvent-free gas-generating pyrotechnic composition, comprising: a binder, ... wherein said binder comprises at least one solid polymer, having a molecular mass greater than 200,000, selected from the group consisting of

polyester polymers and acrylic polymers, wherein said binder comprises at least one liquid constituent selected from the group consisting of a polyester resin and a plasticizer.”

Scheffee discloses a pyrotechnic gas-generating composition including a binder that is polymeric and may be either a polyester or polyacrylonitrile type, a nitrogen-containing organic compound, additives, and an oxidizer including ammonium perchlorate and a chlorine scavenger. See Scheffee, col. 3, lines 38-44; col. 4, lines 18-21, 38-44. Scheffee teaches that the binder may be a polyester type, but, contrary to claim 15, Scheffee does not disclose, teach or suggest that the binder may be a liquid polyester resin with a solid polyester polymer, having a molecular mass greater than 200,000. In addition, Scheffee does not teach or suggest combining a solid acrylic polymer, having a molecular mass greater than 200,000, with a liquid plasticizer, as set forth in claim 15.

Thus, Scheffee alone does not disclose, teach or suggest the pyrotechnic compositions set forth in claim 15. Combining Scheffee with Evans does not cure the deficiencies of Scheffee.

Evans discloses a detonating fuse having an inert core and a strip of particulate explosive in a polymeric binder wound in a helical fashion around the core. See Evans, col. 1, lines 39-42. The Evans explosive compositions are based on particulate pentaerythritol tetranitrate, or pentrite, incorporated into a polyacrylate rubber, which may be combined with one of its plasticizers. See Evans, col. 3, line 60 – col. 4, line 9. In contrast to the compositions set forth in claim 15, Evans does not teach combining a solid acrylic polymer, having a molecular mass greater than 200,000, with a liquid plasticizer, as set forth in claim 15. Contrary to claim 15, Evans does not disclose, teach or suggest that the binder may be a liquid polyester resin with a solid polyester polymer, having a molecular mass greater than 200,000.

Further, Evans is directed toward detonating fuses and explosive compositions. Scheffee is directed toward gas-generating compositions usable for automobile airbags. One of ordinary skill in the art of automobile airbag manufacturing and gas-generating compositions used therein would not have been motivated to combine explosive compositions such as those disclosed in Evans with Scheffee to improve gas-generating compositions in automobile airbags. Accordingly, one of ordinary skill in the art would not have combined the gas-generating compositions of Scheffee with the explosive compositions of Evans.

Scheffee, alone or in combination with Evans, does not disclose, teach or suggest the pyrotechnic compositions set forth in claim 15. Combining Scheffee and/or Evans with Yamato does not cure the deficiencies of Scheffee and Evans.

Yamato discloses a gas-generating pyrotechnic composition, usable in automobile airbags, that includes a nitrogen-containing organic compound, an oxidizer that may include ammonium perchlorate, additives and a binder that may include an acrylic rubber. Contrary to claim 15, Yamato does not disclose, teach or suggest that the binder may be a liquid polyester resin in combination with a solid polyester polymer, having a molecular mass greater than 200,000. Contrary to claim 15, Yamato does not disclose, teach or suggest that the binder may be a liquid polyester resin with a solid polyester polymer, having a molecular mass greater than 200,000. In addition, Yamato does not teach combining a solid acrylic polymer, having a molecular mass greater than 200,000, with a liquid plasticizer, as set forth in claim 15.

Thus, Scheffee, alone or in combination with Evans and Yamato, does not disclose, teach or suggest the pyrotechnic compositions set forth in claim 15. Combining Scheffee and/or Evans and/or Yamato with Nielson does not cure the deficiencies of Scheffee, Evans and Yamato.

Nielson discloses an extrudable ignition composition for use in combination with a gas-generating pyrotechnic compositions for automobile airbags. See Nielson, col. 2, lines 15-21. Nielson teaches compositions including a binder, an oxidizer and a fuel, all of which are preferably water-soluble, and water. See Nielson, col. 2, lines 49-56. Contrary to claim 15, the Nielson compositions are not gas-generating. See generally Nielson, col. 5, line 5 – col. 6, line 12.

In addition, Nielson also does not disclose, teach or suggest that the binder may be a liquid polyester resin in combination with a solid polyester polymer, having a molecular mass greater than 200,000. Contrary to claim 15, Nielson does not disclose, teach or suggest that the binder may be a liquid polyester resin with a solid polyester polymer, having a molecular mass greater than 200,000. Nielson also does not teach combining a solid acrylic polymer, having a molecular mass greater than 200,000, with a liquid plasticizer, as set forth in claim 15. The broad disclosure of gums in Nielson (col. 2, line 64 – col. 3, line 11) provides no motivation to chose as a binder either a solid polyester polymer, having a molecular mass greater than 200,000, in combination with a liquid polyester resin or a solid acrylic polymer, having a molecular mass greater than 200,000, in combination with a liquid plasticizer.

Thus, Scheffee, alone or in combination with Evans, Yamato and Nielson, does not disclose, teach or suggest the pyrotechnic compositions set forth in claim 15. Combining Scheffee and/or Evans and/or Yamato and/or Nielson with Han does not cure the deficiencies of Scheffee, Evans, Yamato and Nielson.

Han discloses explosive molding powder compositions including an organic solvent, a binder and optionally a plasticizer. See Han, col. 1, lines 39-42. In contrast to the compositions set forth in claim 15, Han does not teach combining a solid acrylic polymer, having a molecular mass greater than 200,000, with a liquid plasticizer, as set forth in claim 15. Contrary to claim 15, Evans does not disclose, teach or suggest that the binder may

be a liquid polyester resin with a solid polyester polymer, having a molecular mass greater than 200,000.

Further, in contrast to the composition of claim 15, Han teaches using a solvent in its compositions. See Han, col. 1, line 41. Claim 15 sets forth a solvent-free gas-generating pyrotechnic composition, and claim 30 sets forth a method for manufacturing the solvent-free gas-generating pyrotechnic composition of claim 15, by kneading the ingredients into a homogenous paste, extruding the paste into rods, and cutting the rods into charges. Because Han teaches the necessity of a solvent, Han does not disclose, teach or suggest the pyrotechnic composition of claim 15.

Further, Han is directed toward explosive compositions. Scheffee is directed toward gas-generating compositions usable for automobile airbags. One of ordinary skill in the art of automobile airbag manufacturing and gas-generating compositions used therein would not have been motivated to combine explosive compositions such as those disclosed in Han with Scheffee to improve gas-generating compositions in automobile airbags. Accordingly, one of ordinary skill in the art would not have combined the gas-generating compositions of Scheffee with the explosive compositions of Han.

Thus, Scheffee, alone or in combination with Evans, Yamato, Nielson and Han, does not disclose, teach or suggest the pyrotechnic compositions set forth in claim 15. Combining Scheffee and/or Evans and/or Yamato and/or Nielson and/or Han with Monte does not cure the deficiencies of Scheffee, Evans, Yamato, Nielson and Han.

Monte discloses solid propellants including a powdered oxidizer dispersed in a cross-linkable organic binder. See Monte, col. 1, lines 61-67. Unlike claim 15, Monte does not disclose using either a nitrogen-containing organic compound or a chlorine scavenger. In addition, Monte also does not disclose, teach or suggest that the binder may be a liquid polyester resin in combination with a solid polyester polymer, having a molecular mass

greater than 200,000,. Monte also does not teach combining a solid acrylic polymer, having a molecular mass greater than 200,000, with a liquid plasticizer, as set forth in claim 15.

Further, Monte is directed toward propellant compositions for use in missiles, rockets and gas generation. Scheffee is directed toward gas-generating compositions usable for automobile airbags. One of ordinary skill in the art of automobile airbag manufacturing and gas-generating compositions used therein would not have been motivated to combine explosive compositions such as those disclosed in Monte with Scheffee to improve gas-generating compositions in automobile airbags. Accordingly, one of ordinary skill in the art would not have combined the gas-generating compositions of Scheffee with the explosive compositions of Monte.

Thus, Scheffee, alone or in combination with Evans, Yamato, Nielson, Han and Monte, does not disclose, teach or suggest the pyrotechnic compositions set forth in claim 15.

For at least the above reasons, claims 15-29 are patentable over Scheffe in view of Evans, Yamato, Nielson, Han and Monte. Accordingly, reconsideration and withdrawal of the rejection are respectfully requested.

V. Conclusion

In view of the foregoing, it is respectfully submitted that this application is in condition for allowance. Favorable reconsideration and prompt allowance of claims 15-34 are earnestly solicited.

Should the Examiner believe that anything further would be desirable in order to place this application in even better condition for allowance, the Examiner is invited to contact the undersigned at the telephone number set forth below.

Respectfully submitted,



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